REMARKS

This amendment is responsive to the Final Office Action dated May 16, 2005. Applicants have amended claims 1, 2, 4, 6, 7, 11, 14, 15 16, 24, 31, 32, 35, 42, 47, 63, 65, 71, 74, 78 and 81-85 and cancelled claims 3, 34 and 72-73. Claims 1, 2, 4-33, 35-71 and 74-85 are pending upon entry of this amendment.

Claim Rejection Under 35 U.S.C. § 102

In the Office Action, the Examiner rejected claims 1-14, 16-30, 32-45, 47-61, 63-79, and 81-83 under 35 U.S.C. 102(e) as being anticipated by Wilford et al. (USPN 6,687,247). Applicants respectfully traverse the rejection. Wilford fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. 102(e), and provides no teaching that would have suggested the desirability of modification to include such features.

Applicants have amended the claims to clarify that the certain claims are directed to a routing device in which routing functions are centralized into a routing module that performs routing functions for a plurality of interface cards. In other words, the routing module performs route lookups for packets received from a network by *different* interface cards. In some embodiments, the central routing module includes an interface card concentrator module integrated with a packet forwarding engine. The interface card concentrator module receives packets from multiple interface cards and provides the packets from the different interface cards to the packet forwarding engine for route lookup. In this manner, the routing functions need not be replicated and distributed to the individual linecards and, in some embodiments, may make use of a routing module that integrates the interface card concentrator and the routing lookup functions. This may have the practical advantage of lowering cost and reducing material and size of the overall routing device.

This architecture is described throughout the present application and shown, for example, in FIG. 1 of the present application. FIG. 1 of the present application is reproduced below and shows one embodiment of a router 10 having a plurality of removable interface cards 18 and a centralized routing engine 14 and a forwarding engine 16 separate from the interface cards. As described in the present application, routing engine 14 and forwarding engine 16 may be formed on a single printed circuit board to provide centralized routing and forwarding functions for a

plurality of external, removable interface cards. FIG. 2 illustrates an example embodiment of an interface card concentrator in further detail.

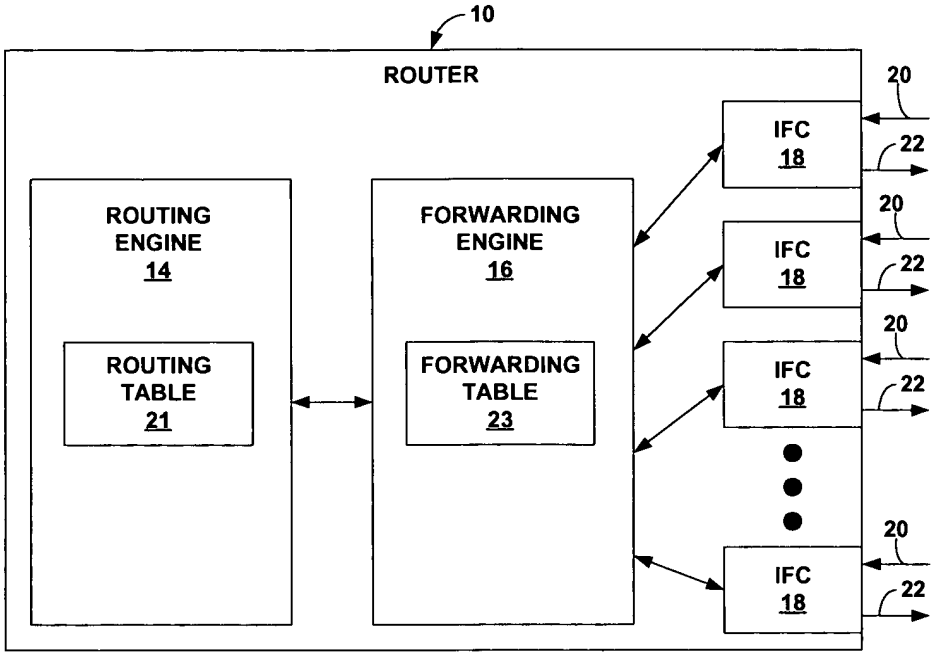

FIG. 1

Claims 1, 2 and 4-14

Applicant has amended claim 1 to clarify that the claimed embodiment includes a router module separate from the plurality of removable interface cards, and the router module includes a packet forwarding engine and an interface card concentrator module coupled between the packet forwarding engine and the plurality of interface cards. Claim 1 as amended requires that the interface card concentrator module communicates packets from *at least two different ones* of the removable interface cards to the packet forwarding engine, and that that packet forwarding engine *performs route lookups for the packets received from the at least two different ones of the plurality of interface cards by the interface card concentrator module to select routes for the packets and forwards the packets back to the plurality of interface cards via the interface card concentrator module.* Claim 1 further requires that the packet forwarding engine and the concentrator module are integrated into a *single unit separate from the plurality of interface cards.*

In contrast, Wilford describes a distributed architecture in which routing functions are performed by each interface card (referred to by Wilford as "linecards"). In fact, Wilford

specifically refers to the architecture of FIG. 1 as a "distributed routing scheme" in which "routing is performed immediately on packet receipt [from the network 1] in each linecard."[1]

Further, Wilford states that the linecards consists of three main sections: the network physical interface, the layer 3 packet switching system, and the fabric interface.[2] According to the Wilford architecture, each linecard includes three components: (1) the physical medium providing connectivity to the network, (2) routing lookup circuitry, and (3) an interface to switching fabric interconnecting the linecards.

Thus, Wilford describes each interface card as including includes its own, local route lookup circuit that is applied to packets as the packets are received from the network by that linecard. In other words, Wilford describes a routing architecture in which each interface card makes localized routing decisions *only* for packets received from a network by *that same* linecard. In this sense, Wilford describes the antithesis of a routing module that performs centralized routing functions for packets received from a network by different removable interface cards. The distributed routing architecture of Wilford is probably best illustrated in FIG. 1, reproduced below.

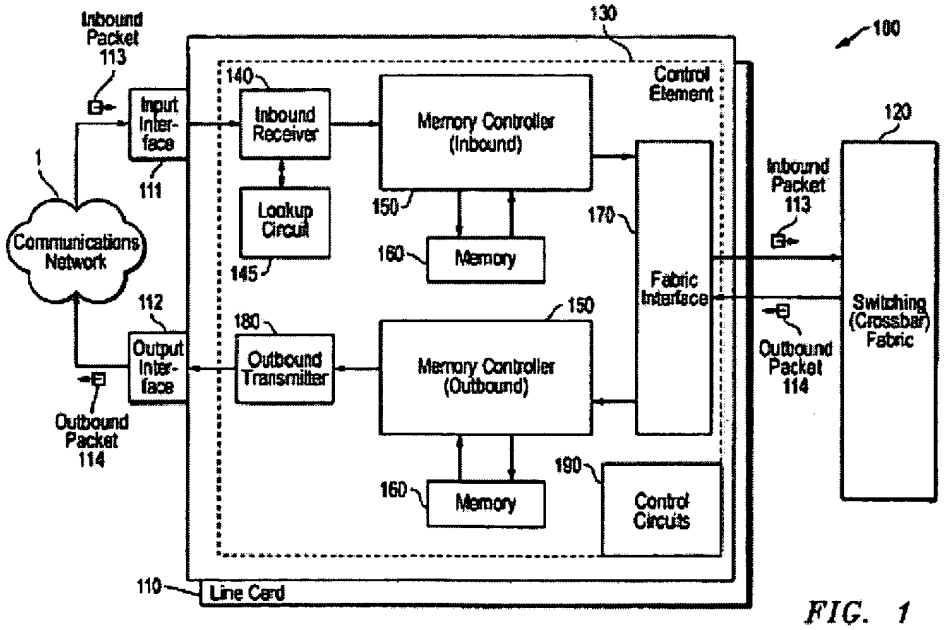

FIG. 1

[1] Wilford at col. 2, ll. 29-31.
[2] Wilford at col. 4, ll. 49-50.

As shown in FIG. 1 of Wilford, the Wilford router includes a plurality of linecards 110 (which is an interface card in the sense that it provides the physical medium for connecting the network as explained by Wilford). As shown in FIG. 1, *each* linecard 110 specifically includes its own corresponding lookup circuit 145 that performs route lookup for packets 113 received from network 1 by *that particular linecard.* Each linecard 110 provides a physical interface 111, which is described as part of the linecard that provides physical connection to network 1.[3] Each linecard 110 further includes an inbound receiver 140 thereon for receiving the packets directly from communication network 1. Lookup circuit 145 is *only* coupled to the inbound receiver 140, and the lookup circuit for each linecard performs route lookups *only* for the inbound packets received from the network 1. In other words, lookup circuit 145 does not perform route lookups for any packets received from any other linecard. As evidence of this point, Wilford states:

> In a manner well-known in the art, packets are received from the physical medium of the network at input interface 111. The inbound packet receiver 140 operates in conjunction with lookup circuit 145 to determine routing treatments for inbound packets 113.[4]

Similarly, with respect to the embodiment of FIG. 2, Wilford makes clear that inbound receiver 220 directs only a portion of inbound packets 113 to lookup circuit 225 for route lookup.[5]

After performing the route lookup, the lookup circuit forwards the inbound packets to switch fabric interface 170 for outputting to the communication network 1 by any of the other linecards without requiring any further route lookups. As illustrated by FIG. 1 and FIG. 2 and made clear by Wilford, route lookups are only applied to an inbound packets by the linecard 110 that received the packet from the network. No lookup circuit 145 performs route lookups for packets received by any other linecard 110.

Wilford fails to anticipate or suggest at least the following elements of claims 1-14:

1. First, Wilford fails to teach or suggest a router module separate from the plurality of removable interface cards. In contrast, Wilford makes abundantly clear that route lookup circuits 145 and 225 are distributed to each linecard 110, and that in the "distributed routing scheme" of Wilford routing is performed "immediately on packet

[3] Wilford at col. 4, ll. 53-55.
[4] Wiflord at col. 1, ll. 58-67.
[5] Col. 5, ll. 13-15.

receipt [from the network] in each linecard."[6] There simply is no router module in the Wilford architecture that is *separate* from a removable interface card.

On this point the Examiner argues that network physical interface 210 and fabric interface 170 are "separate" from removable linecards 110 because they are shown as separate entities in FIG. 2.[7] However, the Examiner's interpretation of FIG. 2 is incorrect. According to Wilford, FIG. 2 shows a high-level schematic of linecard control element 130, which is part of the line card 110. FIG. 2 illustrates that network physical interface 210 and fabric interface 170 are separate from the control element 130 of the linecard. However, the physical interface 210 and the fabric interface 170 are provided by the linecard 110 itself, as Wilford clearly states at col. 4, ll. 49-53. Thus, physical interface 210 and fabric interface 170 are not "separate entities" from a removable interface card, as asserted by the Examiner. Rather, they are part of the line card.

2. Second, Wilford fails to anticipate or suggest a router module having an interface card concentrator module that communicates packets from *at least two different* ones of the removable interface cards to the packet forwarding engine, and that the packet forwarding engine *performs route lookups* for the packets received *from the at least two different ones of the plurality of interface cards by the interface card concentrator module to select routes for the packets* and forwards the packets back to the plurality of interface cards via the interface card concentrator module.

On this point, the Examiner argues that control element 130 of each linecard 110 is a concentrator module and refers to FIG. 1. However, as discussed in detail above, Wilford makes it very clear that route lookup circuit 145 only performs route lookups for inbound packets 113 received from the network 1 and not for any packets received from any other linecards 110. Thus, the distributed routing architecture of Wilford does not anticipate or suggest an interface card concentrator module that communicates packets from at least two different ones of the removable interface cards to the packet forwarding engine, and that the packet forwarding engine performs route lookups for the packets received from the at least two different ones of the plurality of interface cards by the

[6] Wilford at col. 2, ll. 29-31.
[7] Office Action dated May 16, 2005 at pg. 19.

interface card concentrator module to select routes for the packet, as required by claim 1. The lookup circuits 145, 225 of the Wilford linecards 110 do not receive packets from any other linecards and are part of the inbound packet paths of the linecards.

3. Third, Wilford fails to anticipate or suggest a routing module in which a packet forwarding engine and a concentrator module are integrated into a single unit separate from the plurality of interface cards. On this point, the Examiner the Examiner argues that the control module 130 and lookup circuit 145 of the Wilford linecards are an interface card concentrator module and packet forwarding engine, respectively, and that FIG. 1 of Wilford shows the control module 130 and lookup circuit 145 integrated into a single unit.

This analysis is flawed for the reasons discussed above in that control module 130 does not communicate packets *from at least two different* ones of the removable interface cards to the packet forwarding engine. Control module 130 of any particular linecard 110 of Wilford directs only inbound packets 113 from network 1 to route lookup circuit 145. Thus, control module 130 cannot be viewed as an interface card concentrator that communicates packets from at least two different removable interface cards to a packet forwarding engine that performs route lookups for those packets. Wilford's description of a control module 130 on each linecard 110 does not anticipate or suggest an interface card concentrator module that communicates packets from at least two different ones of the removable interface cards to the packet forwarding engine that performs route lookups on those packets. For at least this reason, the Examiner reliance on these elements as anticipating or even suggesting an interface card concentrator module that directs packets from multiple interface cards to a packet forwarding engine, wherein the interface card concentrator module and the packet forwarding engine are integrated into a single unit is also flawed.

With respect to claim 2, Wilford does not describe a routing device in which a midplane is coupled between a plurality of interface cards and the router module and separates the plurality of removable interface cards from the router module. In rejecting claim 2, the Examiner refers to the fabric interface 170 of FIG. 1 as a midplane. However, as thoroughly discussed above, the switch fabric interface 170 is provided on the linecards 110 as is control unit 130 and lookup

circuit 145. Thus, switch fabric 170 is not coupled between linecards 110 and route lookup circuit 145 at all. For this same reason, switch fabric 170 does not separate the plurality of removable linecards 110 from the control module 130 or lookup circuit 145. Hence, Wilford does not teach or suggest the requirements of claims 2.

With regard to dependent claim 11, Wilford fails to teach or suggest a packet forwarding module that selects routes *lookups for the packets received from the at least two different ones of the plurality of interface cards* by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface modules. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140. Thus, the lookup circuit 145 performs routing functions only for packets received from the network *by input interface 111 of that particular linecard.* In other words, in Wilford, in no way can lookup circuit 145 process packets received from interface modules other than input interface 111. Thus, no route lookup is performed at all for packets received from other linecards. Thus, Wilford does not teach or suggest a packet forwarding engine that selects routes to forward packets using a forwarding table that stores route information for forwarding data packets received from any of the different interface modules, as required by claim 11.

Dependent claims 4-10 and 12-14 are patentable for at least the reasons set forth above with respect to claim 1.

Claims 16-30

Independent claim 16 requires a router module comprising a packet processing circuit, a memory management circuit, and a route lookup circuit integrated into a *single* module *separate* from a plurality of *interface cards*. Claim 16 specifically requires that the route lookup circuit be separate from a plurality of interface cards. In rejecting claim 16, the Examiner refers to Wilford and states that route lookup circuit 145 (225 in FIG. 2) is separate from "interfaces cards 113 and 114."[8]

First, Applicant points out that in Wilford, elements 113 and 114 of Wilford refer to an inbound packet 113 and an outbound packet 114. Thus, the Examiner is incorrect with respect to

[8] Office Action at pg. 7.

her construction of Wilford in this regard. For purposes of this response, Applicants assume that the Examiner meant to refer to interfaces 111 and 112. However, Wilford's discussion of FIG. 1 and FIG. 2 makes clear that all of the components of control element 130 and interfaces 111 and 112 are provided on each linecard 110. In particular, Wilford states that "[e]ach linecard 110 includes an input interface 111, an output interface 112, a fabric interface 170 and a control element 130."[9]

Thus, Wilford fails to teach or suggest a route lookup circuit integrated into a single module *separate* from a plurality of *interface cards* as required by claim 16. Directly to the contrary, lookup circuits 145 and 225 are provided on a single card 110 along with interfaces 111 and 112.

Moreover, Wilford fails to teach or suggest a routing device in which the midplane communicates to the router module packets received from the network *by at least two different ones of the interface cards*, and wherein the central router module performs *route lookups for the packets received from the at least two different ones* of the interface cards to select routes for the packets and forward the packets back to the interface cards in accordance with route information associated with the network. As discussed in detail above, Wilford makes it very clear that route lookup circuit 145 only performs route lookups for inbound packets 113 received from the network 1 and not for any packets received from any other linecards 110.

With regard to dependent claim 24, Wilford fails to teach or suggest a packet forwarding module that selects routes for the packets received from the at least two different ones of the interface cards by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface cards. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and only performs routing functions for packets received from the network by that particular linecard. In no way can lookup circuit 145 perform route lookup for packets received from other linecards. Thus, in no manner does Wilford teach or suggest a packet forwarding engine that selects routes to forward packets using a forwarding table that stores route information for forwarding data packets received from any of the different interface cards, as required by claim 24.

---

[9] Wilford at col. 1, ll. 34-36.

With respect to claim 30, the Examiner states that Wilford describes a packet processing circuit configured to build an L2 header, as required by Applicants' claim. However, the cited portion of Wilford merely states that the Wilford controller "compares" a packet payload length of an L2 header when forwarding a packet. Comparing a payload length in an L2 header of a received packet is entirely unrelated to actually building an L2 header, as required by Applicant's claims. Thus, the Examiner has failed to address the elements of Applicants' claim 30 and has failed to establish a prima facie case for anticipation of claim 30.

Dependent claims 17-23, 25-29 and 31 are patentable for at least the reasons set forth above with respect to claim 16.

Claims 32, 33 and 35-45

Applicants have amended claim 32 to require the router module performs route lookups for a first set of the data packets received from the network by a first one of the interface cards and for a second set of the data packets received from the network by a second one of the interface cards to select routes for the data packets and to forward the data packets between the interface cards. Claim 32 further requires that the router module comprises a system control module that performs the route lookups and at least one concentrator module that receives the data packets from the interface cards. Claim 32 also requires that the system control module and the concentrator module are integrated into a single unit separate from the interface cards.

In previously rejecting claim 32, the Examiner again refers to elements 113 and 114 as interfaces. As noted above, elements 113 and 114 of Wilford refer to an inbound packet 113 and an outbound packet 114, respectively. Assuming the Examiner meant interfaces 111 and 112, Wilford makes clear that all of the components of a linecard (e.g., control element 130 and lookup circuit 145) as well as interfaces 111 and 112 are provided on a single linecard. Thus, Wilford fails to teach or suggest a router module **separate** from a plurality of "**interface cards,**" as required by claim 32. Directly to the contrary, in Wilford, lookup circuits 145 and 225, input interface 111 and output interface 112 are provided on the same card 110.

Moreover, Wilford fails to anticipate or suggest a router module that performs route lookups for a first set of the data packets received from the network by a first one of the interface modules and for a second set of the data packets received from the network by a second one of

the interface cards to select routes for the data packets. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and only performs routing functions for packets received from the network by that particular linecard. In no way can lookup circuit 145 perform route lookup for packets received from other linecards.

In addition, Wilford fails to anticipate or suggest a router module having a system control module and a concentrator integrated in a single unit, where the concentrator module receives the data packets from at least the first one and the second one of the removable interface cards.

With respect to claim 33, Wilford makes no mention of a midplane coupled to the plurality of interface cards and to the router module. As described in detail above with respect to Applicants' claim 2, in the Wilford system lookup circuit 145 and memory controllers 150 and 160 are coupled between input interface 111 and fabric interface 170. Thus, it cannot be said that fabric interface 170 is a midplane coupled to a plurality of interface cards. Fabric interface 170 is not coupled to a plurality of interface cards (i.e., interfaces 111 and 112 or network physical interface 210). Instead, fabric interface 170 of Wilford is coupled to lookup circuit 145 and memory controllers 150 and 160.

With respect to claims 34, Wilford does not disclose or suggest a memory management circuit that provides data to a concentrator that is separate from a plurality of interface cards, as described in detail above with respect to claim 4. To the extent that control unit 130 can be viewed as a "concentrator," as asserted by the Examiner, the control unit 130 of Wilford is provided by the same linecard 110 that provides interfaces 111 and 112. Thus, Wilford clearly fails to teach or suggest a concentrator separate from the plurality of linecards.

With regard to dependent claim 42, Wilford fails to teach or suggest a control module that selects routes by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface cards. As described above, Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and performs routing functions only for packets received from the single input interface of **that particular linecard**. In no way can lookup circuit 145 perform route lookup for packets received from other linecards. Thus, in no manner does Wilford teach or suggest a control module that selects routes to forward packets using a forwarding table that stores route

information for forwarding data packets received from any of the different interface cards, as required by claim 42.

Dependent claims 35-41 and 43-45 are patentable for at least the reasons set forth above with respect to claim 32.

Claims 47-61

Independent claim 47 requires at least one routing device having a midplane that communicates to a router module a first set of packets received from the network by a first one of the interface cards and a second set of packets received from the network by a different one of the interface cards, wherein the router module performs route lookups for the first set of packets and the second set of packets in accordance with route information associated with the network. As discussed above, Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and performs routing functions only for packets received from the single input interface of **that particular linecard**. In no way can lookup circuit 145 perform route lookup for packets received from other linecards. Thus, in no manner does Wilford teach or suggest the router module performs route lookups for a first set of packets received from one interface card and a second set of packets received from a different interface card in accordance with route information associated with the network.

Further, claim 47 requires a router module separate from a plurality of removable interface cards to process data packets and to forward the data packets between the interface cards. As described above, Wilford makes clear that all of the control element 130, lookup circuit 145 and interfaces 111 and 112 are provided on within linecard 110. Thus, contrary to the Examiner's assertion, interfaces 111 and 112 are not interface cards separate routing lookup circuit 145. Quite the opposite, interfaces 111 and 112 are on the same card 110 as the routing lookup circuit 145.

For at least these reasons, Wilford also fails to anticipate or suggest a packet processing circuit, a memory management circuit, and a route lookup circuit integrated into a single module separate from the plurality of removable interface cards. In Wilford, routing circuits 145 and 220 are provided on the interface cards and not as a single unit separate from the cards.

With regard to dependent claim 55, Wilford fails to teach or suggest a route lookup circuit that selects routes by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface cards. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and only performs routing functions for packets received from input interface 111 of that particular linecard. Thus, in no way can lookup circuit 145 perform route lookup for packets received from other interface cards. Packets from other interface cards (i.e., outbound packets) are not even sent to lookup circuit 145. Thus, in no manner does Wilford teach or suggest a route lookup circuit that selects routes to forward packets using a forwarding table that stores route information for forwarding data packets received from any of the different interface cards, as required by claim 55.

With respect to claim 61, the Examiner states that Wilford describes a packet processing circuit configured to build an L2 header. However, the cited portion of Wilford merely states that the Wilford controller "compares" a packet payload length of the L2 header when forwarding a packet. This is entirely unrelated to building an L2 header, as required by Applicant's claims. Moreover, the Examiner entirely overlooks the requirements of claim 61 of "rewriting an L3 header for an outbound data packet." Thus, the Examiner has failed to establish a prima facie case for anticipation of claim 61.

Dependent claims 48-54 and 56-60 are patentable for at least the reasons set forth above with respect to claim 47.

Claims 63-70

Independent claim 63 requires a router comprising one hardware board integrally housing an interface concentrator that provides electrical interfaces to receive incoming packets from a plurality of interface cards, a packet processing circuit, a memory management circuit, and a route lookup circuit *separate from the interface cards* to *perform route lookups* to select routes a first packet and a second packet of the incoming packets received from a network by *different ones* of the plurality of interface cards.

In rejecting claim 63, the Examiner states that Wilford teaches "a route lookup circuit to select routes for the incoming packets received from the plurality of interface cards."[10] Again, the Examiner has misunderstood the architecture of the Wilford router in which lookup circuit 145 (225 in FIG. 2) only performs routing functions for packets received from the single input interface of that particular linecard 110. Packets from other interface cards (i.e., outbound packets) are not even sent to the lookup circuit (145 & 225). Thus, in no way does Wilford teach a route lookup circuit that selects routes for a first packet and a second packet of the incoming packets received from a network by *different ones* of the plurality of interface cards. Wilford clearly describes the architecture as a "distributed routing scheme" in which "routing is performed immediately on packet receipt in each linecard."[11] Wilford simply does not describe a route lookup circuit *separate from the interface cards* to *perform route lookups* to select routes a first packet and a second packet of the incoming packets received from a network by *different ones* of the plurality of interface cards.

Moreover, as discussed, Wilford provides no teaching or suggestion of a hardware board integrally housing an interface concentrator that provides electrical interfaces to receive incoming packets from a plurality of interface cards, a packet processing circuit, a memory management circuit, and a route lookup circuit separate from the interface cards. Wilford provides no teaching of such an integrated board separate from the interface cards.

With respect to claim 67, Wilford fails to teach a route lookup circuit that selects routes by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface cards. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and only performs routing functions for packets received from input interface 111 of that particular linecard. Thus, in no way can lookup circuit 145 perform route lookup for packets received from other interface cards. Packets from other interface cards (i.e., outbound packets) are not even sent to lookup circuit 145. Thus, in no manner does Wilford teach or suggest a route lookup circuit that selects routes to forward packets using a forwarding table that stores

[10] Office Action at pg. 10.
[11] Wilford at col. 2, ll. 29-31.

route information for forwarding data packets received from any of the different interface cards, as required by claim 67.

With respect to claim 70, the Examiner states that Wilford describes a packet processing circuit configured to build an L2 header. However, the cited portion of Wilford merely states that the Wilford controller "compares" a packet payload length of the L2 header when forwarding a packet. This is entirely unrelated to building an L2 header, as required by Applicants' claims. Moreover, the Examiner entirely overlooks the requirements of claim 70 of "rewriting an L3 header for an outbound data packet." Thus, the Examiner has failed to establish a prima facie case for anticipation of claim 70.

Dependent claims 64-66 and 68-69 are patentable for at least the reasons set forth above with respect to claim 63.

Claims 71 and 74-79

Independent claim 71 requires coupling a midplane to a plurality of interface modules, and coupling a plurality of interface modules to the midplane. Claim 71 requires that the router module is configured to perform route lookups for data packets received from different ones of the interface modules via the midplane to select routes for the packets in accordance with route information associated with the network and forward the packets back the interface modules by way of the midplane. Claim 71 also requires that the router module comprises a system control module and at least one concentrator module integrated into a single unit separate from the interface modules.

For reasons set forth above, Wilford fails to teach or suggest a router module that is configured to perform route lookups for data packets received from *different* ones of the interface modules via a midplane to select routes for the packets. Further, as explained above, Wilford fails to teach or suggest a router module having a system control module and at least one concentrator module integrated into a single unit separate from the interface modules. In the Wilford system, each linecard provides interfaces 111, 112 and router lookup circuits 145 or 225, and these lookup circuits apply route lookups only for packets received from the network, not for packets received from other linecards.

With regard to dependent claim 78, Wilford fails to teach or suggest a system control module that selects routes by referencing a forwarding table, wherein the forwarding table stores route information for forwarding data packets received from any of the plurality of interface modules. As described above, FIG. 1 of Wilford makes clear that the lookup circuit 145 is only coupled to inbound receiver 140 and performs routing functions only for packets received from the network by that particular interface. In no way can lookup circuit 145 perform route lookup for packets received from other linecards. Thus, in no manner does Wilford teach or suggest a packet forwarding engine that selects routes to forward packets using a forwarding table that stores route information for forwarding data packets received from any of the different interface modules, as required by claim 78.

Dependent claims 74-77 and 79 are patentable for at least the reasons set forth above with respect to claim 71.

Claim 81

Independent claim 81 requires providing a routing module separate from the plurality of interface cards. Claim 81 further requires coupling the router module comprising a packet processing circuit, a memory management circuit, and a route lookup circuit integrated into a single module to the plurality of interface cards via a midplane. Claim 81 also requires that the router module is configured to perform route lookups for the data packets received from different ones of the interface cards to select routes for the packets in accordance with route information associated with the network and forward the packets back to the interface cards by way of the midplane.

In rejecting claim 81, the Examiner refers to FIG. 1 and col. 17 of Wilford, which describes a receive ASIC (RX ASIC) that performs the functions of lookup circuit 225, which is provided on the linecards 110. Thus, the receive chip (ASIC) of Wilford is generally unrelated to Applicants' requirements of providing a routing module separate from a plurality of interface cards.

Moreover, as discussed in detail above, Wilford makes clear that control element 130, lookup circuit 145 and interfaces 111 and 112 are provided on each card. For example, in reference to FIG. 1, Wilford clearly states that "[e]ach linecard 110 includes an input interface

111, an output interface 112, a fabric interface 170 and a control element 130." Thus, Wilford fails to teach or suggest providing a router module **separate** from a plurality of "**interface cards,**" as required by claim 81. Directly to the contrary, in Wilford, lookup circuits 145 and 225 are provided on linecards 110 along with input interface 111 and output interface 112.

Further, as discussed above, the distributed routing scheme of Wilford does not anticipate a router module that is configured to perform route lookups for the data packets received from *different* ones of the interface cards to select routes for the packets in accordance with route information associated with the network and *forward the packets back the interface modules by way of the midplane.*

Claims 82 and 83

Similarly, for at least the reasons set forth above, Wilford fails to teach or suggest a router module separate from the plurality of interface cards to process the data packets and to forward the data packets between the interface modules, as required by independent claims 82 and 83. As discussed in detail above, Wilford makes clear that control element 130, lookup circuit 145 and interfaces 111 and 112 are provided on each card and, therefore, are not separate from the interface cards. In Wilford, each linecard is an interface card. Moreover, columns 14-19 referred to by the Examiner describe an implementation of control element 130 having three distinct ASICs (RX, MCC and TC ASICs). Nevertheless, these ASICS are provided on each interface card 110 of Wilford. Thus, Wilford does not describe a router module separate from the plurality of interface cards.

Further, Wilford fails to teach or suggest a router module that is configured to perform route lookups for the data packets received from at least different ones of a plurality of interface cards to select routes for the packets in accordance with route information associated with the network.

In order to support an anticipation rejection under 35 U.S.C. 102(e), it is well established that a prior art reference must disclose each and every element of a claim.[12] Wilford fails to disclose each and every limitation set forth in claims 1-14, 16-30, 32-45, 47-61, 63-79, and 81-

[12] *See Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231 USPQ 81 (CAFC 1986) ("it is axiomatic that for prior art to anticipate under 102 it has to meet every element of the claimed invention").

83. For at least the reasons set forth above, Wilford fails to establish a prima facie case for anticipation under 35 U.S.C. 102(e). Withdrawal of this rejection is requested.

Claim Rejection Under 35 U.S.C. § 103

In the Office Action, the Examiner rejected claims 15, 31, 46, 62, 80, 84 and 85 under 35 U.S.C. 103(a) as being unpatentable over Wilford in view of Zadikian et al. (USPN 6,724,757). Applicants respectfully traverse the rejection. Wilford and Zadikian fail to disclose or suggest the inventions defined by Applicants' claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention.

In general, Zadikian fails to overcome the deficiencies of Wilford. For example, similar to Wilford, Zadikian describes a router having a plurality of linecards coupled via a switch matrix. Zadikian makes clear that the linecards (interface cards) of the described router perform route selection and forwarding functions:

> *The linecard terminates an input signal from one of the other nodes in the network. For example, in a SONET-based implementation, a single SONET/SDH OC-48 signal is terminated by an a linecard, although other signal levels (OC-192, OC-12, and so on) may be supported. In one embodiment, the software consists of two threads, one that runs in the background and is responsible for non-time critical tasks. The other thread, which runs at the interrupt level, is responsible for all real-time aspects of the software, including limited overhead processing, alarm detection and forwarding, and fault detection and recovery. The linecard processor maintains a copy of its firmware and startup code onboard.*[13]

In regard to claims 15, 31, 46, 62, and 80, the Examiner correctly recognized that Wilford fails to teach or suggest a redundant router module to process the data packets and to forward the data packets between the interface modules in response to malfunction of the router module. Similarly, with respect to claims 84 and 85, the Examiner correctly recognized that Wilford fails to teach or suggest a switch arrangement coupled to the plurality of routing devices and configured to switch control from a first routing device to a second routing device. However, the Examiner suggests that it would have been obvious to modify the Wilford routing device in view of the Zadikian to include a redundant router module.

Applicants respectfully point out that even if modified as suggested by the Examiner, Applicants' claimed invention would not be achieved. For example, both Wilford and Zadikian

describe routers in which each linecard requires an internal control element that performs routing functions for only those packets received from the network by the input interface of that particular linecard. Thus, as Zadikian makes clear, redundancy is accomplished by utilizing groups of redundant linecards.[14] For example, Zadikian states "[p]referably, the group matrix is a 2:1 reduction stage that selects output signals from one of two linecards."[15] In fact, this point illustrates one of the many fundamental differences between Applicants' claimed invention and the applied references. The Wilford and Zadikian routers require localized routing functions within each linecard, and redundancy can only be achieved with the addition of multiple linecards.

Neither Wilford nor Zadikian describe a separate router module capable of forwarding data packets received from any of the plurality of interface modules. As result, neither the Wilford routing device nor the Zadikian routing device is capable of being modified to include a redundant router module capable of providing similar functionality.

For at least these reasons, the Examiner has failed to establish a prima facie case for non-patentability of Applicants' claims 15, 31, 46, 62, 80, 84 and 85 under 35 U.S.C. 103(a). Withdrawal of this rejection is requested.

---

[13] Col. 21, ll.50-62 (emphasis added).
[14] See, e.g., cols. 6-8.
[15] Col. 8, ll. 21-23.

CONCLUSION

All claims in this application are in condition for allowance. Applicants respectfully request reconsideration and prompt allowance of all pending claims. Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

Date: January 3, 2006

By: Kent O. Sieffert

SHUMAKER & SIEFFERT, P.A.
8425 Seasons Parkway, Suite 105
St. Paul, Minnesota 55125
Telephone: 651.735.1100
Facsimile: 651.735.1102

Name: Kent J. Sieffert
Reg. No.: 41,312